



**Queensland University of Technology**  
Brisbane Australia

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# **CIB 2013 World Congress**

## **Does sustainable housing construction provide the home owner with a greater investment return?**

### **Abstract**

Over the past 20 years there has been a considerable push at all three tiers of Government and private industry in Australia to improve the energy efficiency and sustainability levels of residential housing. A number of these initiatives have been voluntary, such as solar power and solar heating rebates, with other mandatory measures being incorporated into building standards and codes.

Although the importance of energy efficiency and sustainable materials have been widely conveyed both at the academic and public level, it does not always reflect in the residential house purchase decision by typical house buyers, including residential property investors. This paper will analyse a range of housing markets in Brisbane to determine the investment performance of those markets over the past 3 years to determine any significant differences between new residential suburbs and older residential suburbs where houses have not been constructed to the current energy efficiency and sustainability guidelines. The range of suburbs to be analysed will focus on middle to lower high value suburbs, with a particular focus on residential housing in Master Planned Communities to determine if socio-economic factors and development size and scope have an impact of the purchase and investment performance of sustainable houses in comparison to older housing stock. The paper confirms that the residential property market shows a higher capital return for residential property built under stricter sustainability guidelines than similar located and type of property built prior to the BCA 2004 and older style project type homes erected prior to 2000.

**Keywords:** Residential property, sustainable houses, investment performance.

### **1. Introduction**

Sustainable housing design, materials and energy efficiency in housing has been a focus of Governments in Australia for many years. Although new residential construction standards have been legislated in countries such as Australia (Building Code of Australia, 2009), New Zealand (New Zealand Building Act 2004) and US (**Energy Efficiency in Housing Act of 2009**) to ensure that some levels of energy efficiency and sustainability are factored into

both design and construction materials, this is not the case with existing housing stock built prior to current regulations.

In these situations the various governments have opted for voluntary schemes to improve the energy efficiency and sustainability of older housing stock, such as the home insulation scheme and solar hot water schemes introduced by the Australian Government in 2009.

In Australia, the Commonwealth Government is also in the process of legislating mandatory disclosure of residential building energy, greenhouse and water efficiency performance at the time of sale or lease from May 2011 (Council of Australian Government (COAG), 2009).

The issue of sustainability in buildings has been gaining momentum since first identified as a factor in the environmental debate in the early 1990's. Initially identified as a commercial building issue, sustainability and in particular energy usage, has now entered the vernacular of home owners/occupiers.

## **2. Sustainable Building and Energy Codes and Regulations**

### **2.1 International**

Since The European Parliament and The Council of the European Union issued its Directive on the energy performance of buildings in 2002, a number of member countries have set building energy usage goals and introduced supporting legislation (Official Journal of the European Communities, 2002):

- The UK has set a goal that all new houses should be net-zero emissions by 2016. The United Kingdom's Code for Sustainable Homes was established in 2007, with compulsory rating against the Code of new homes from 2008. The Code uses a star rating from 1 to 6, based on performance against 9 sustainability criteria which combined to assess the overall environmental impact. Energy usage is a key criterion, with an Energy Performance Certificate required for the sale of all new homes. (Department of Communities and Local Government (UK), 2010)
- German authorities have set a goal that by 2020 buildings should be operating without fossil fuel. Mandatory disclosure of home energy usage at the time of sale or lease came into effect on 1 July 2008. Two types of Energy Certificates are required: a Demand Certificate applies to the building's thermal efficiency, rating aspects of energy efficiency such as the walls, roof, windows and furnace. The Usage

Certificate is based on the actual energy use of the property over the past three years. (Deutsche Energie-Agentur, 2010)

- France introduced thermal regulations in 2000 and 2005 which defined performance levels for new buildings. From 2012, all buildings are to be low-consumption (energy ratio for heating, DHW, cooling, ventilation and lighting must be less than 50kWh/m<sup>2</sup>.y). By 2020, all buildings are to be energy-positive by balancing their low consumption by the production of renewable energy. (French Environment and Energy Management Agency 2010; Lenoir, Garde, Ottenwelter, Bornarel, & Wurtz, 2010)

Following Europe's lead, legislative sustainability targets for housing, and in particular energy usage in homes, have been introduced in a number of countries around the world including USA, Canada, Malaysia, and New Zealand (Eves and Bryant, 2012).

### **2.3 Australia - Federal**

Increases in energy efficiency regulation in Australia gained momentum in 2004 when 4-star energy efficiency was mandated in Australia for all new residential dwellings through the Building Code of Australia. In 2007 this mandate was increased to a five-star rating. All States and territories in Australia have now agreed to make all new residential dwellings six-star energy efficient by May 2011 (Housing Industry Association, 2010a, 2010b). However, this regulation is specific to new residential housing and not housing stock existing prior to 2004.

At the April 2009 meeting of the Council of Australian Government (COAG), it was agreed to introduce an Australia wide mandatory disclosure scheme to provide information to home buyers or renters about the energy efficiency of dwellings (Council of Australian Government (COAG), 2009). This scheme was due to commence in May 2011 across the nation and was based on the allocation of a thermal performance star rating by an accredited assessor for all homes for sale or lease, in a similar nature to the long running ACT model. Future expansion of the scheme is to include water consumption and greenhouse gas emissions (Eves and Bryant, 2012). Issue of sustainability in buildings has been gaining momentum since first identified as a factor in the environmental debate

## **2.4 Australia – Other States**

The Australian Capital Territory (ACT) has had mandatory thermal efficiency disclosure for all homes sold since 1999. This star rating (0 to 10) must be included in all advertising material with the full certificate, including possible improvements to the property, included in contract documents. This rating system requires accredited and trained assessors to measure a home's energy efficiency based on thermal qualities only, such as building fabric, window design, orientation, air leakage and cross ventilation. It excludes energy consumption other than temperature control, such as lighting, appliances, hot water etc. New homes built since 1995 are required to meet a minimum 4 star energy rating (National Framework for Energy Efficiency, 2008).

### **Queensland**

As stated previously, the Queensland State Government mandated disclosure of the sustainability features of dwellings for sale in Queensland from 1 January 2010. Compliance with this legislation requires specific action from each of the three parties involved in a transaction, being the seller, the sales agent, and the buyer.

The seller is required to complete a "Sustainability Declaration" checklist ("the form") prior to the property being put on the market. The form which is a declaration of the dwelling's environmental and social sustainability features in four key areas: energy, water, safety and access. The seller is able to complete the form themselves, and the seller may leave items on the form blank if they do not know the answer. However, the seller can be liable for any losses incurred by the buyer as a result of false or misleading information contained on the form.

The sales agent is required to include information on where a copy of the Sustainability Declaration is available from on all forms of advertising, excluding newspaper and magazine advertisements. A copy of the completed form is to be on display whenever the home is open to the public for inspection and a copy must be provided to any prospective buyer on request.

The onus is on the buyer to ask for a copy of the form from the selling agent. (Queensland Government, 2009a, 2009b, 2010a, 2010b). With the election of the Liberal National Party in 2012, this legislative requirement was repealed and is no longer mandatory for residential property sales in Queensland

The Cost of Living Amendment Bill 2012 (COLA) amendments to the Building Act 1975 came into effect in June 2012 and this resulted in the elimination of the sustainability declaration. This legislative change has resulted in residential property vendors in Queensland no longer having to complete and sign a sustainability declaration, and if a declaration is available, it no longer has to be supplied to the potential buyer.

### **3. Residential Property: Consumer Awareness**

Since 2004, there has been a greater emphasis from all levels of government, private industry and interest groups associate with the residential property sector on the benefits and importance of sustainable building practices and materials and the need for energy efficiency in housing design and appliances. The new residential construction in the MPCs has been based on the legislative requirements for sustainable and energy efficient homes, as well as the continuing public awareness of these issues

Despite these continuing legislative frameworks and general awareness raising of energy and water costs in home ownership and occupation, this is not always considered to be a major factor in the residential house purchase decision making process. A study by Reed and Mills (2007) found that the financial aspects of the house purchase decision were the most significant factor for first home buyers and not the environmental factors. A further study by Eves and Kippes (2010, 2009; Kippes & Eves, 2010) found that in the German and New Zealand residential property markets, buyers were more concerned about the price of the property, its location and number of bedrooms, than the energy efficiency or green rating of the property. These studies also showed that buyers were generally unaware of the energy efficiency schemes and measures and considered the most important environmental aspect of the residential dwelling to be the aspect of the building.

Kippes and Eves (2010) also found that although mandatory disclosure of sustainability features were required for both residential home buyers and renters, in less than 50% of residential sales transactions it was not considered important by the purchaser and even less so by those considering leasing residential property.

A further study by Eves and Bryant (2012) found widespread disengagement with the sustainability declaration process was recorded from sellers, and even more so, from buyers. Results from this study indicated that 98% of buyers did not ask for a copy of the sustainability declaration at any time during the sales process. Despite this, sellers during this period were legislatively required to complete these forms to their best knowledge, prior to the property going to the market. Whilst agents are not required by law to provide sustainability declarations to potential buyers, many do (60%). Therefore, up to 40% of the forms completed by sellers, were never provided to any potential buyer. Of those that are used, virtually none (96%) impacted on the buyer's decision making process. Since this 2012 study, the Queensland government has removed this requirement to produce a sustainability declaration form from the residential sales process.

Previous studies in the area of buyer awareness in 2009, noted that environmental issues were not a major factor in the house purchase decision. This study again confirms that a further year on, this is still the case (Eves and Kippes, 2009).

#### **4. Research Methodology**

This paper compares the change in price for residential property in Master Planned Communities (MPCs) and the immediately surrounding residential suburbs. For this study the MPC selected were the larger developments in Brisbane being Forest Lakes, Springfield and North Lakes. These MPCs were developed from the late 1990s and comprise a mix of housing constructed before the BCA 2004 and after the introduction of the BCA 2004, which incorporated a greater focus on sustainability. Although the age of housing in these newer MPCs varies from those erected at the commencement of the precincts to houses recently completed, the actual lot size in these MPCs is a relatively good estimate of the age of the dwelling. Pre BCA 2004 building regulations, the minimum lot size for residential property in Brisbane was 400m<sup>2</sup> in the outer suburbs of Brisbane and 450m<sup>2</sup> in the inner city suburbs. Since 2004, the councils in the greater Brisbane area have allowed the lot size for new residential construction to be below the 2004 limit of 400m<sup>2</sup> and in a number of the new estates residential lot sizes are below 280m<sup>2</sup>.

For this study sales of houses with a lot size less than 400m<sup>2</sup> were classified as houses built since 2004 under the stricter building codes and greater consumer awareness of energy efficient housing.

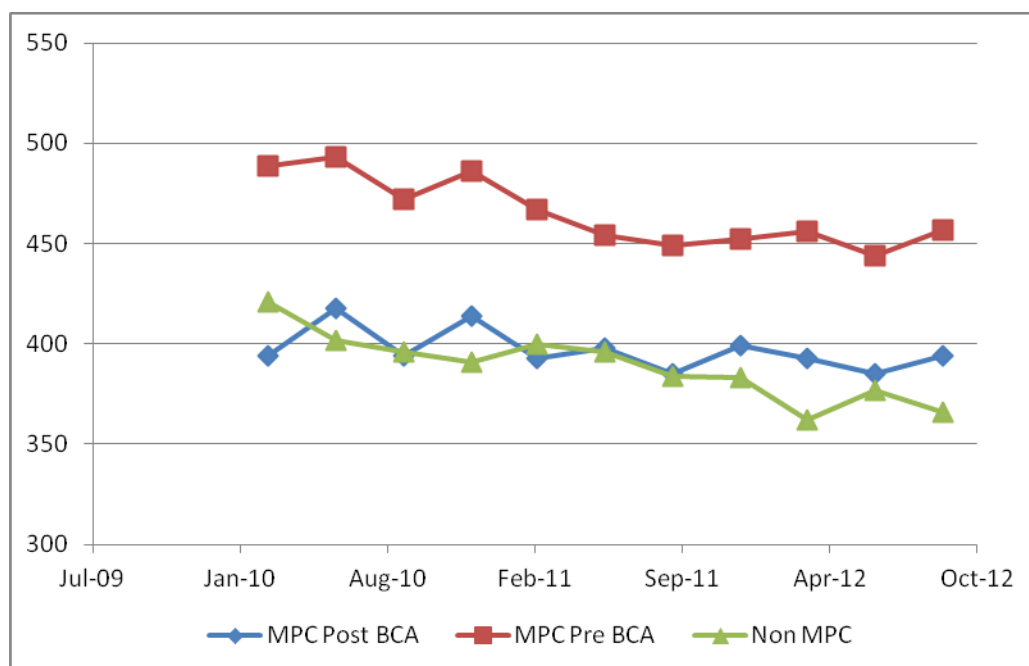
All residential property sales for the period January 2010 to September 2012 were obtained from PriceFinder, a commercial database that allows residential property sales to be isolated

on a land area, location and size basis. All sales for three MPCs and the immediately adjoining older developed suburbs were obtained for the period January 2010 to September 2012. These areas are predominately outer suburban areas of Brisbane and the housing covers the late 1990s though to 2012. Only the sale of freestanding residential properties was included in the analysis. In total there were 1,518 sales transactions for the properties classified as post BCA 2004, 1,642 sales for residential property in MPCs built prior to 2004 and 1814 sales transactions for residential property in the adjoining suburbs that were built prior to BCA 2004. The relatively similar socio-economic nature of these MPCs and surrounding suburbs eliminates locational and service differences that can influence residential property prices and price movements.

## 5. Results and Discussion

Figure one shows the change in the average price for residential property in the three building age categories. From this figure, it can be seen that the general trend in the price for freestanding residential properties has been reasonably similar for the properties in the MPCs over the past three years. The higher average price for the pre 2004 BCA properties actually reflects the larger land size (> 400m<sup>2</sup>) rather than building size or construction.

**Figure 1: Average Residential Price per Quarter: 2010-2012**





Although this time period covers a relatively slow residential sale and new construction period, the difference in the quarterly trend for the average sale price is significant between property sales in the Brisbane MPCs and the immediate adjoining suburbs, especially during 2102, where there was a slight recovery in the price of houses in the MPVCs but a continuing decline in house prices in the adjoining suburbs. The adjoining pre BCA 2004 constructed houses also did not show the uplift in house prices in the latter part of 2011 that was experienced by the post BCA constructed dwellings in the MPCs.

**Figure 2 Capital Return Index: Sustainable Housing: 2010-2012**

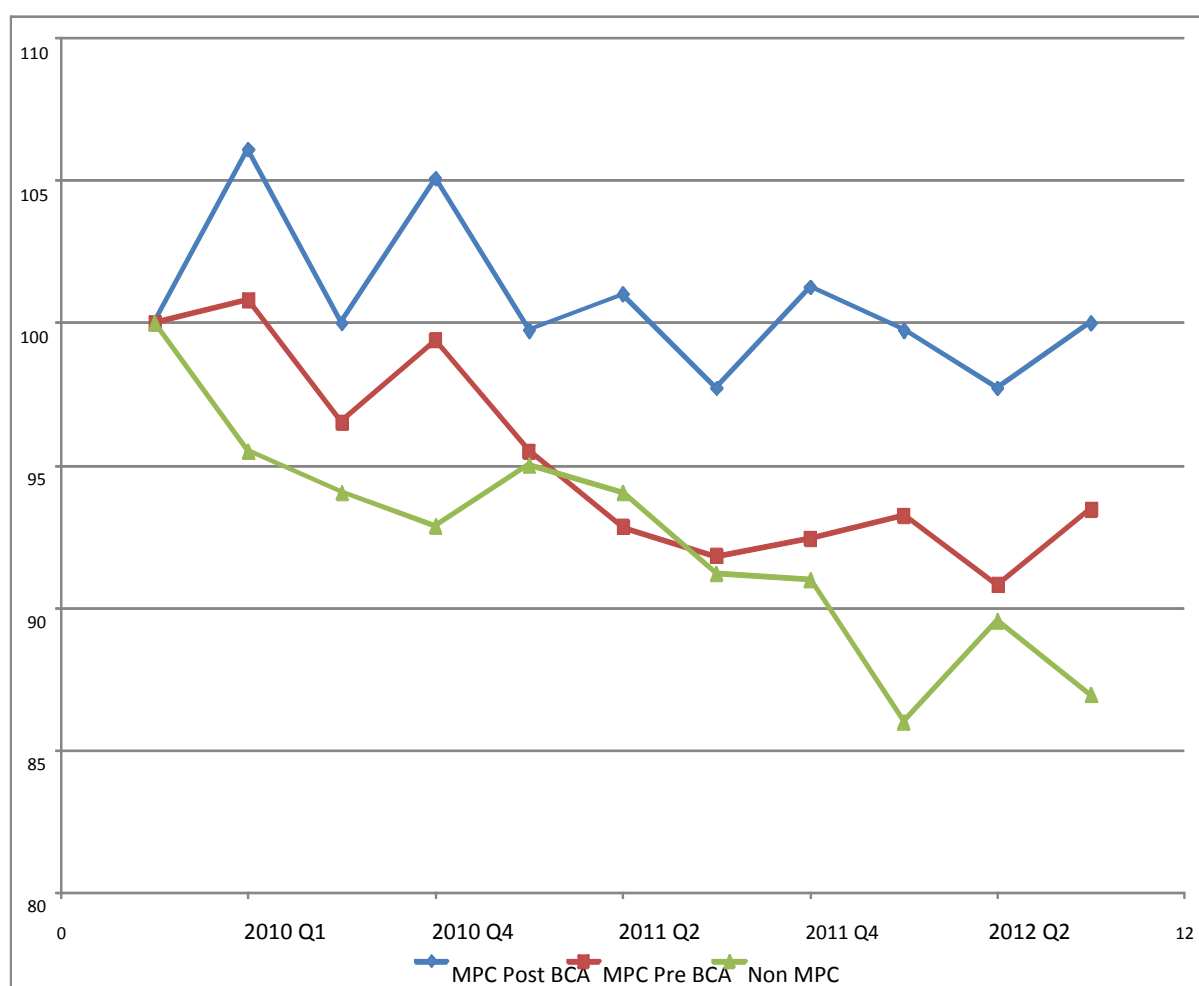


Figure 2 and Table 1 provides a more detailed perspective of the capital return performance of the three housing sectors, based on the index performance per quarter. From this table it

can again be seen that the capital growth (loss) for residential property in the MPCs for both pre and post BCA2004, has followed a similar trend in 2010, with a series of gains and losses in the four quarters. However, in the first half of 2011, there was a considerably larger decrease in capital growth for the pre BCA 2004 constructed houses compared to the more sustainable post BCA 2004 houses in these developments. Figure 2 also shows that the overall capital return performance for the post BCA 2004 houses has been well above the capital return performance for the pre BCA 2004 houses both within and outside the MPCs. Over the study period, the houses in that have been built under the stricter sustainable building code have shown a slight increase in the index from the base of 100 to 101. During the same period the index for the pre BCA houses in the MPCs fell to 93, with the houses in the adjoining suburbs falling from an index value of 100 in quarter 1 2010 to 87 in quarter 3 2012.

Table 1

	<b>Pre BCA 2004</b>	<b>Pre BCA 2004 MPC</b>	<b>Post BCA MPC</b>
<b>Jun-10</b>	-4.51	0.82	6.09
<b>Sep-10</b>	-1.49	-4.26	-5.74
<b>Dec-10</b>	-1.26	2.97	5.08
<b>Mar-11</b>	2.30	-3.91	-5.07
<b>Jun-11</b>	-1.00	-2.78	1.27
<b>Sep-11</b>	-3.03	-1.10	-3.27
<b>Dec-11</b>	-0.26	0.67	3.64
<b>Mar-12</b>	-5.48	0.88	-1.50
<b>Jun-12</b>	4.14	-2.63	-2.04
<b>Sep-12</b>	-2.92	2.93	2.34
<b>Average Quarter Capital return%</b>	-1.35	-0.64	0.08
<b>Volatility</b>	2.93	2.68	4.20

This significant difference in the capital return per quarter between the houses that were constructed on a more sustainable basis and those that were constructed prior to 2004 is highlighted in Table 1. Over the period, only the residential markets in the MPCs with houses

constructed in accordance with BCA 2004 showed an average positive quarterly return of 0.08%, with a high of 6.09% in quarter 2, 2010 and a lowest quarterly return of -5.74% in September 2010. During this same period, the average quarterly return for other residential property in MPCs was -0.64%, with a maximum quarterly return of 2.93% in September 2012 and a low of -4.26% in September 2010. The residential property in the suburbs adjoining the MPCs returned a negative quarterly return of -1.35%, with the highest quarter return being 4.14% in June 2012 and the lowest return being -5.48% in March 2012. During this period, the volatility for the post BCA 2004 houses was 4.2%, reflecting the higher return. However, of note is the fact that the residential market with pre BCA 2004 construction adjoining the MPCs had a volatility of 2.93%, which was higher than the same style of construction in the MPCs despite the lower capital growth. On a risk return basis, the post BCA 2004 houses were the best performing asset class.

**Table 3 Capital Return Comparison.**

	Pre BCA 2004	Pre BCA 2004 MPC	Post BCA MPC
Capital return 2010-2012 %	-14.36	-9.66	-5.06

Table 3 compares the average price of residential property in the three sectors based on the price in March 2010 to the average price at the end of September 2012. From this table, it is again confirmed that the more sustainably built houses have shown the better investment performance over this particularly slow residential market period in Brisbane. The change in price from Quarter 1, 2010 to quarter 3, 2012 was -5.06% for the sustainable houses in MPCs, with the pre BCA 2004 houses in the adjoining suburbs actually showing a price decrease of -14.36%.

## 6. Conclusion

This study has provided empirical evidence that the residential property sector will pay more for an environmentally sustainable home compared to a similar located residential property that has not been constructed with the same level of environmental sustainability.

In addition, the purchaser of a home constructed according to the BCA 2004 standards can actually expect a higher investment performance compared to purchasing a house constructed prior to 2004. Over time these investment returns can be more than those other residential property sectors; however, of more importance is the fact that in a down market, the change in price for a sustainable dwelling is significantly less than the downward price movement for non sustainable residential property.

Although consumer awareness of energy efficiency and sustainable building construction has been limited in the past, this study suggests that there is an increasing trend in residential property buyers and investors placing value on more sustainable and energy efficient house designs.

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